



## Abstract View

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# Variability in the Upper-Ocean Internal Wave Field at a Sargasso Sea Site

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### ABSTRACT

Two 3.5 month time series records of upper-ocean current and density profiles collected in opposite seasons as part of the LOTUS (Long-Term Upper-Ocean Study) project at 34°N, 70°W indicate substantial variation in the shape of horizontal current spectra in the internal wave frequency range. The near-inertial peak in these records shifts by as much as 10% in frequency and varies by a factor of 5 in height across the depth range of the seasonal pycnocline. Near-inertial currents are weaker and less strongly circularly polarized in the spring-summer than in the fall-winter record. Spectral frequency and vertical wavenumber dependences differ from those predicted by the Garrett-Munk internal wave model. Energy fluxes are vertically asymmetric and internal wave energy varies linearly with rms subinertial current speed.

Several aspects of the observed variability can be understood through two simple models. Depth dependence of near-inertial motions can be explained as a characteristic of linear response to forcing by random moving wind systems. Temporal variations in the shape, level, and polarization of current spectra can be explained as modulation of the deep-ocean internal wave spectrum through conservation of wave action flux as low-frequency, large vertical scale, weakly horizontally sheared currents are encountered.

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